

LA-UR-22-31440

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Intended for: Web

Issued: 2022-10-27



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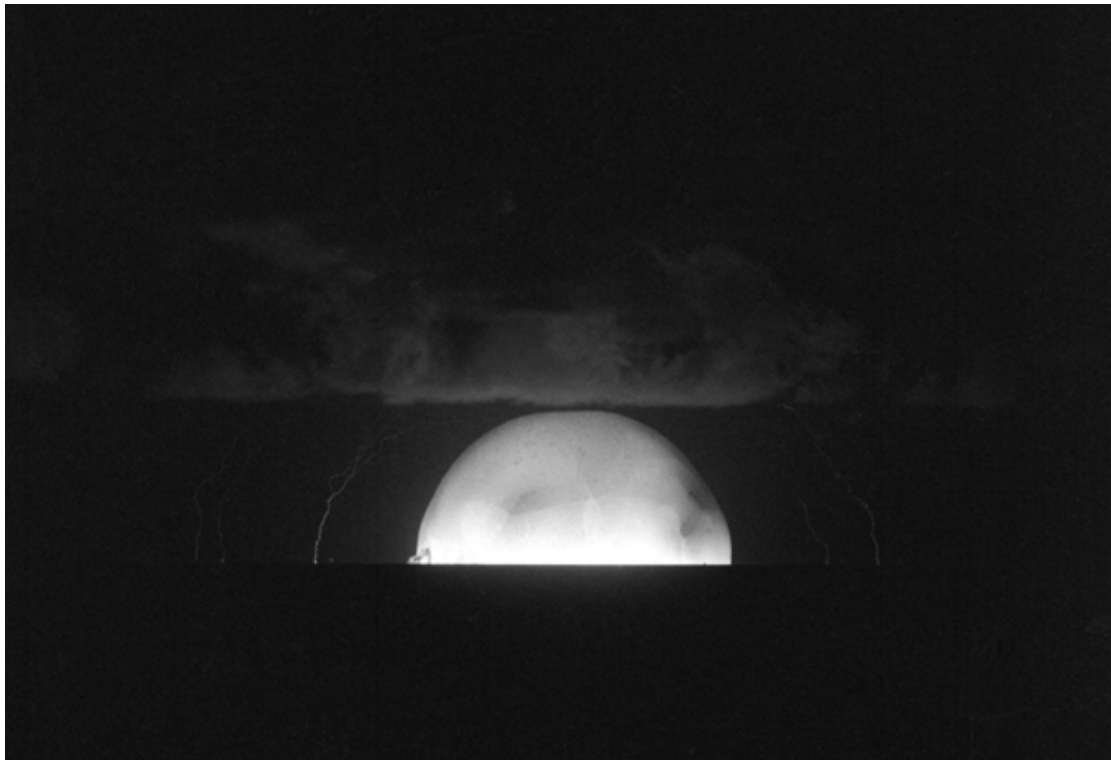
Video, photos capture first full-scale H-bomb test 70 years ago

By **Julie Miller**, librarian-archivist, [National Security Research Center](#)

Ivy Mike was the first successful full-scale hydrogen bomb test. Almost 500 times more powerful than the Fat Man weapon released above Japan, Mike's 10.4-megaton blast vaporized the tiny island on which it was detonated November 1, 1952.

Ivy Mike was a thermonuclear device — commonly called an H-bomb — in which a substantial portion of its energy was generated by fusion, or the combining of hydrogen atoms. The remaining portion of its energy release resulted from fission, the splitting of uranium or plutonium atoms. (Atomic bombs use fission, while hydrogen bombs use fusion.)

This collection of images was curated by the National Security Research Center in recognition of the 70th anniversary of the nuclear test codenamed “Mike” of Operation Ivy. The NSRC is the Lab's classified library, which also houses unclassified artifacts from the Lab's history. The NSRC has archived photos of nuclear tests from over the years to preserve our history.



Caption: This image of Ivy Mike was captured with a Rapatronic camera, which was used to take images of a quickly changing subject. (Photo courtesy of Lawrence Livermore National Laboratory.)

Why is Ivy Mike significant?

“Following the Soviet Union detonation of an atomic bomb on August 29, 1949, there was great concern in the U.S. government and military that, if it were feasible, the Soviets might develop an H-bomb ahead of America,” said **Michael Bernardin**, former Associate Laboratory Director for Weapons Physics (ALDX), adding that if Russians achieved this capability ahead of the U.S., they could place intolerable pressure on the West relative to their ambitions in Europe and in other locations they were seeking to dominate.

“Research conducted to date at Los Alamos suggested the prospects for a thermonuclear explosive were questionable, at best, although the research team numbered only a handful of scientists and engineers,” Bernardin said.

Historical perspective

“Mike became a reality because both [first Lab Director] J. Robert **Oppenheimer** and [second Lab Director] Norris **Bradbury** supported thermonuclear research both during and after World War II,” said Laboratory Historian **Roger Meade** (C-NR). President Harry Truman made the decision to pursue the development of thermonuclear weapons in January 1950. Los Alamos substantially increased its effort, moving to a six-day work week. The test was a key step to validate the Teller-Ulam design.



Caption: Ivy Mike was tested 70 years ago on November 1, 1952.

The detonation

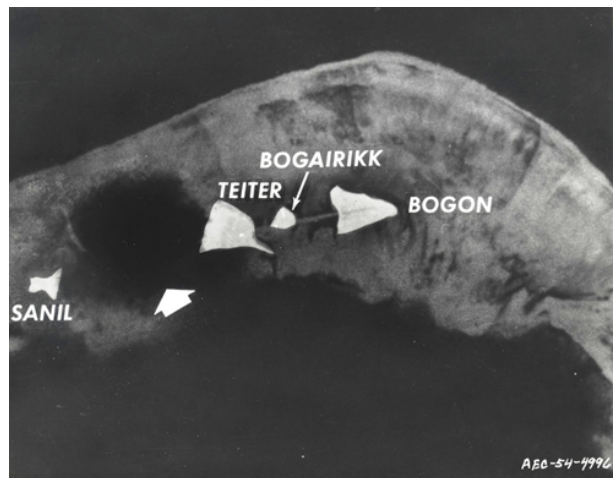
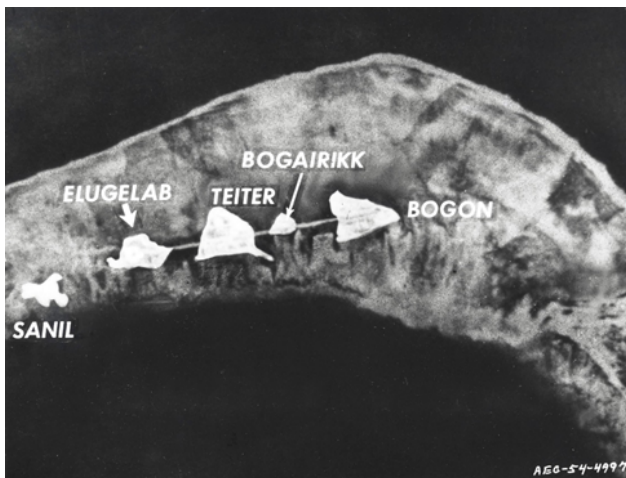
Ivy Mike was detonated on Elugelab island, part of Enewetak Atoll in the Marshall Islands in the Pacific. Elugelab island was selected for safety reasons — it was about the farthest point on the Enewetak Atoll from the base camps.

The total number of personnel involved was nearly 11,650, of which 9,350 were military members and 2,300 were civilians.

At 7:15 a.m. local time on November 1, the firing circuits for the device were triggered. The Mike device detonated instantaneously, producing a blinding flash. [A tremendous fireball arose and evolved into a massive mushroom cloud.](#) There was no doubt: the Ivy Mike device demonstrated that an H-bomb was feasible. And America was the first to demonstrate this, delivering on President Truman's edict.



Caption: Elugelab island is the fourth island from foreground.



Caption: Enewetak atoll is pictured before the Mike test (left) and after (right). The Elugelab island on which it was detonated was vaporized, leaving a large underwater crater where Elugelab had been.

Who was involved in the Ivy Mike test?

Late in January 1951, Los Alamos scientist Edward Teller and Stan Ulam made a fundamental conceptual breakthrough that completely changed the prospect of a workable thermonuclear device. Over the next six months, physicists and engineers rallied around this concept as its theoretical foundations matured.

UNITED STATES ATOMIC ENERGY COMMISSION PATENT BRANCH		AEC CASE NO.
RECORD OF INVENTION <small>This Record of Invention is an important legal document and proper care in its early and complete preparation will save important time and inconvenience in the future. The instructions* on the back should be read carefully before filling in the data.</small>		S-14058
(A) INVENTOR (S) NAMED:	(D) TITLE OR POSITION:	
Edward Teller	S.M.	
Stanislaw M. Ulam	S.M.	
(B) EMPLOYED BY:	(C) PERMANENT ADDRESS:	
(E) TITLE OF INVENTION (F):		
Thermonuclear Device.		
(C) DESCRIPTION OF INVENTION (D):		
Application dated - - - - 2/12/57 Ref XXVIII-1560		
(F) DATES AND PLACES OF INVENTIONS:		
(1) CONCEPTION BY INVENTOR (2):		
about Feb 1 - 1951 at Los Alamos		
(3) FIRST SKETCH OR DRAWING		
March 9-1951 at L.A. IN WORKBOOK LAMS 1225 PAGE -		
(4) FIRST WRITTEN DESCRIPTION		
March 9-1951 at L.A. IN WORKBOOK LAMS 1225 PAGE -		
(5) DISCLOSURE TO OTHERS (6):		
Hans Bethe - about Feb 15-51		
(7) - - - - - 1951 AT - - - - -		
(8) - - - - - 1951 AT - - - - -		
(9) COMPLETION OF MODEL OR FULL SIZE DEVICE		
Nov 1 - 1952 at Eniwetok		
(10) FIRST TEST OR OPERATION OF INVENTION		
Nov 1 - 1952 at Eniwetok		
(11) RESULTS OF TESTS, AND EXTENT OF USE OF INVENTION (12):		(13) NAMES OF ALL PERSONS HAVING KNOWLEDGE OF FACTS STATED UNDER (2) AND (3):
Satisfactory -		Bradley, Bethe, Teller
(14) PRIOR REPORTS (15):		(16) OTHER CLOSELY RELATED PUBLICATIONS, PATENTS, AND PATENT APPLICATIONS (17):
None		None Known
(18) RIGHTS OF U. S. GOVERNMENT:		(19) LICENSES OR ASSIGNMENTS:
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CONTRACTOR AND ADDRESS:		TYPE OF CONTRACT:
		UNCLASSIFIED RESTRICTED CONFIDENTIAL SECRET
(21) SIGNATURE OF WITNESS: DATE:		SIGNATURE OF INVENTOR(S): DATE:
FORWARDED BY (22) - DATE:		



Caption: The thermonuclear device patent (above) lists inventors as Los Alamos scientists Edward Teller (top right, in his Lab badge photo) and Stanislaw M. Ulam (bottom right, in his Lab badge photo). Results of the test is noted as “satisfactory.”



Caption: The Mike device under construction.

According to the Defense Nuclear Agency report on Ivy Mike, many scientific stations were built or renovated for Operation Ivy. The assembly building for the device was a large building with sophisticated equipment to support and monitor Mike.

Looking for more on the Lab's testing days in the Pacific?

- Get a brief overview of the Lab's [post-World War II testing](#) that began with Operation Crossroads.
- Learn why the Lab [changed the spelling](#) of the Enewetak street sign on campus last spring.
- See [two artifacts](#) from testing in the Pacific proving ground.

Looking for more history?

Want more photos from the Lab's early days? Visit int-nsrc.lanl.gov. Need research assistance? Contact nsrc@lanl.gov.

Questions, comments, or feedback? **Contact the News team** (lanltoday@lanl.gov).